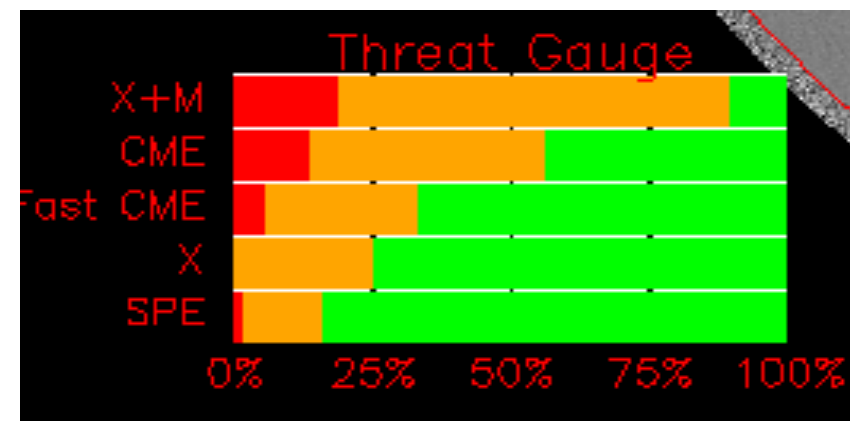
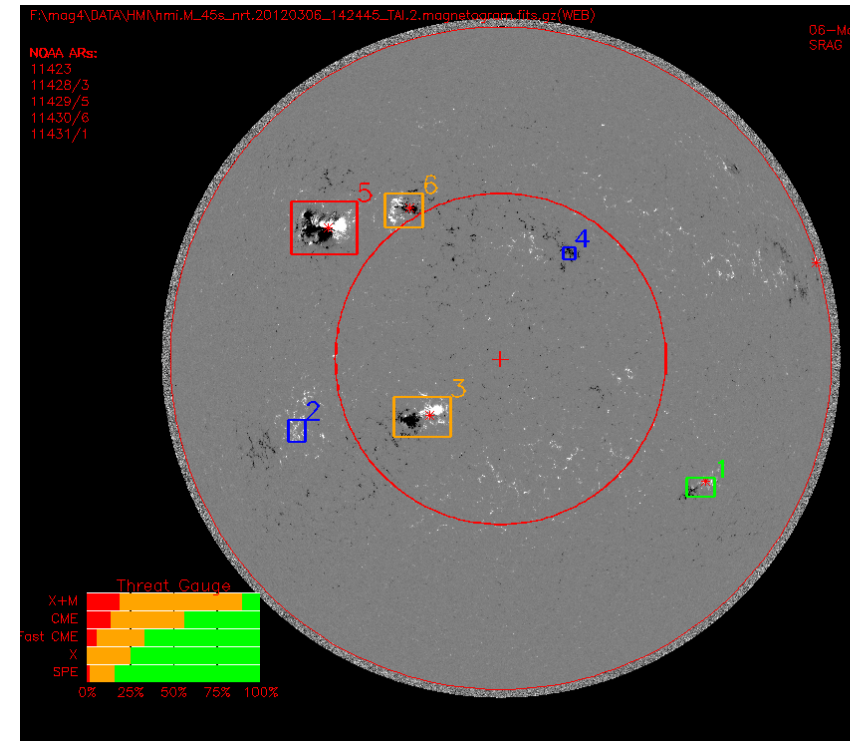
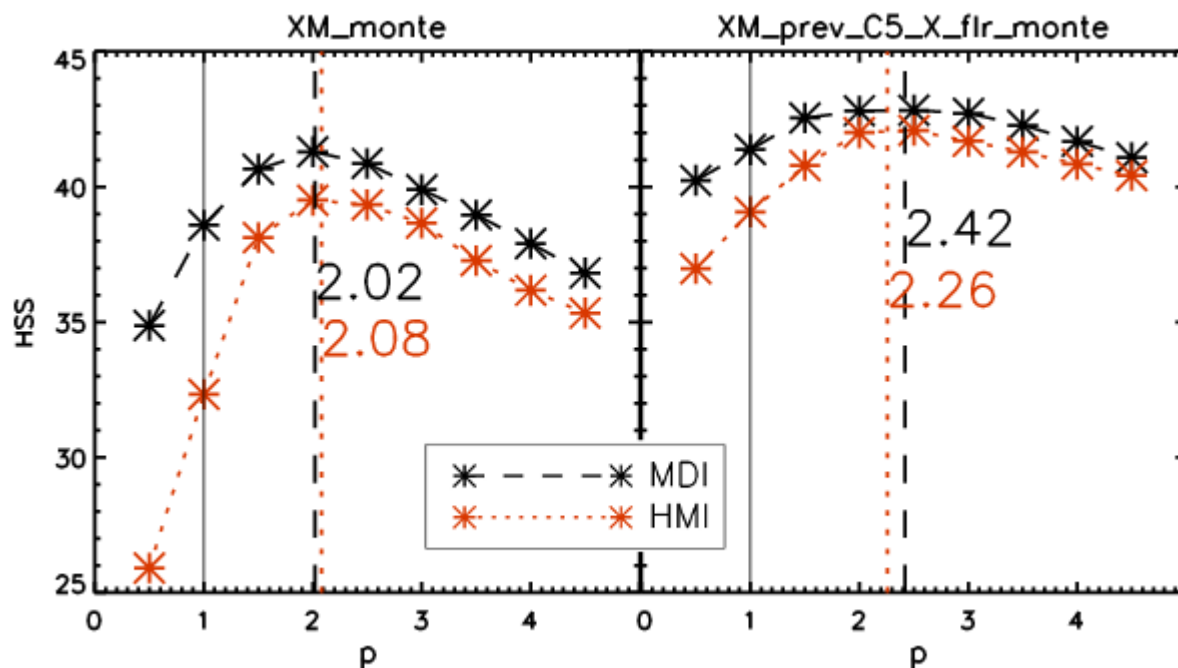


- Flares like earthquakes are very difficult to predict
- Historical records can provide empirical base forecasts
- MAG4 (Magnetogram Forecast) uses empirical data to predict the event rate of dangerous solar activities
- It does this automatically 24/7, making new forecasts every 96 minutes
- It forecasts **major flares**, coronal mass ejections (**CMEs**), and **SPEs**
- **MAG4 solution is easy to understand, portable, reliable, and robust!**
- **POC** David Falconer  
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MAG4 uses a free-energy proxy  $WL_{SGP} = ||\nabla B_Z||^p$ . It presently uses  $p=1$ , but calculates for  $p=0.5$  to  $p=4.5$ . Will Johnson our NASA Academy student found other  $P$ 's to be better. The Y-axis is the Heidke Skill score multiplied by 100. The Left plot is for using the free-energy proxy only for forecasting. The right plot is for using free-energy proxy and previous flare activity. The black curves are for MDI-like resolution, the red curve is for full HMI-resolution. In all cases  $P$  or 2-2.5 gives better forecasts than 1.